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Abstract:
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Index Terms:
Infomedia TV broadcasting TV listings databases TV listings distribution data collec distribution data management **electronic** TV listings data source **electronic program guides** **electronic** publishers information services multimedia interface on-line info service company real-time data capture scheduling information **television** broadcast Infomedia TV broadcasting TV listings databases TV listings distribution data collec distribution data management **electronic** TV listings data source **electronic program guides** **electronic** publishers information services multimedia interface on-line info service company real-time data capture scheduling information **television** broadcast

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TV LISTINGS DATABASES AND THE MULTIMEDIA INTERFACE FOR ELECTRONIC PROGRAMME GUIDES (EPGs)

J Greco

Infomedia S.A., Luxembourg

With the further explosion of channels on the digital multi-media horizon, how will broadcasters be able to cope with the increased demand, from traditional and new electronic publishers, for detailed scheduling information about their programmes? This paper offers comments on the realities of data collection in a world moving ever faster towards "electronic programme guides" (EPGs) and hence the need for real-time data capture, management and distribution.

The comments are put forward by the founder and managing director of Infomedia, in non-technical language which is intended to make clear some of the practical issues of TV listings distribution that we hope broadcasting technology managers will note. An apology is offered right away in case the points raised have already been addressed by the technologies chosen to run today's TV stations. It is only that it is not apparent from our direct experiences of collecting advance TV programme transmission data from the large number of European channels that we work with.

Infomedia S.A. is an on-line information service company that collects, processes and provides Europe's most comprehensive electronic TV listings data source. Based in Luxembourg, Infomedia offers complete programme schedule data for 150+ European TV channels. This data is made electronically accessible to the company's clients, mostly print and electronic publishers, in 20 European countries.

Programming is at the core of the broadcasting business and the TV listings and tracking service Infomedia provides is interesting to a cross section of the world-wide media industry. Infomedia TV data can be packaged, analysed and delivered in many ways to meet a wide range of industry needs, from publishers of printed and electronic TV programme guides, to broadcasters wishing to monitor the activities of their competitors, and the copyright societies who want to accurately track broadcast rights usage.

Data collection is the heart of our business, and our approach in setting up links with the channels, our "information providers", has been unique. Infomedia struggled initially to fulfill its objective of obtaining data "in electronic form" from the channels. Our primary contacts are with the press offices, traditionally the department responsible for putting together the paper programme schedule that is sent out to the press, and which is also used for marketing purposes.

Until quite recently, TV companies have only distributed their listings in paper form, normally as a printed booklet supplemented by faxes advising of programme changes. The main disadvantages of this method, identified and addressed by Infomedia, were:

- that printed schedules were out of date by the time they reached journalists' desks, due to the constantly changing nature of programming in competitive broadcasting environments.
- that publishers needed to chase TV companies who were late or which forgot to send them the schedules and changes, meaning that every TV company's press

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Conference Publication No. 413, © IEE 1995.

office would be fielding calls from the press for the same information

- that TV company press officers could be more productively re-deployed towards the role of programme promotion and away from data distribution.
- that publishers would greatly welcome the opportunity of accessing a one-stop-shop for the collection of all TV data relevant to their needs, in a standardised *electronic* format that could be easily adapted to their internal computerised page-make-up or other systems' needs.
- that a single electronic source, accessible by publishers at their convenience, 24 hours a day, would ease workloads for both TV companies and the press.
- that the electronic nature of a centralised service would facilitate procedures for constant updating of the schedules up to the last minute of broadcast, thereby ensuring an accurate record of European broadcast data.

Today, Infomedia receives more than 80% of the TV programme schedules it collects in electronic form - and has prospered from its ability to extract a standard out of the chaos of data formats it receives - files mostly derived from software used to create the printed and mailed version. This means anything and everything from Word to Quark to Pagemaker and Excel (yes, Excel!) files. Often, the choice of software is made according to the familiarity of the employee with a specific package that they've grown used to. The content presentation, too, details such as the director's name, the country of origin, the original language title, differs dramatically from channel to channel.

This makes us wonder, of course, what is happening inside the TV companies with regard to the use of technology. We continually read of the huge investments being made by broadcasters for their sophisticated scheduling systems, and the multi-million dollar "media servers" that will automatically fulfill all the multi-media management needs of the company.

We know well from reading the trade press that millions are being spent on digital servers capable of transmitting megabytes and megabytes of data. But we also suspect that internally, throughout the broadcasting organisation, the roll-out of information technology resources, and training, is just not happening. At least - we don't see evidence of it from the majority of channels we work with.

So, why aren't the people in the press offices connected up to the main servers, why aren't they aware of how they could access and more easily manipulate the data? Why is so much money and effort being spent by individual TV companies on the job of paper data dissemination disguised as marketing to end users who ultimately need a standardised, customised, electronic format?

With the development and implementation of digital broadcasting, the future holds even more channels in store. A huge corresponding investment is being put into these developments (pay-per-view, near video-on-demand, the increase of thematic channels, interactive services, etc), by the channels. There will be a corresponding leap in the amount of associated data that will have to be collected and processed by any publisher wishing to provide a full information service, including listings data, to consumers. And a real-time updating solution has yet to be found - such as will be required for the new viewer navigation tools - "electronic programme guides".

Infomedia's ability to keep up with the processing workload has put the company in a unique position. It is the only company operating on an international level, centralising data electronically, and using innovative processes to capture and format the listings data. Yet when digital really takes off - there will be a huge increase in the number of channels that need to be tracked.

We'd like to invite technical directors to take note of this pending external need for real-time transmission data dissemination. We'd also like to see signs of information technology resources being integrated in a way that is useful to staff members within their organisations. If you take for example the workflow on the production of a printed TV listings guide for any channel, we first have to consider that this information emanates from the acquisitions and scheduling department.

Surely these highly sophisticated systems provide the possibility to manage all the related data, provided the input is done correctly once, so that the output of data can be designed to fit a multitude of needs?

Our suggestions:

- the channel should be able to provide the data in "electronic form" - the content must be delivered in database format, structured as delimited data fields
- the channel could provide a reliable, constant data supply, including updates, at mutually agreed times.
- the transmission of all the above data should be done electronically, by modem

After Infomedia first came onto the market in 1991 with its proposal to electronically disseminate broadcast listings, some channels decided that they would set up their own electronic dissemination systems. The ones that have been set up range from bulletin boards to electronic mail services, and more recently, the World Wide Web (WWW) hosts a number of broadcasters' home pages.

This evolution presents an excellent justification of our concept. With each of these systems, the information is presented in different electronic formats, and so standardisation of the data is not easy at all for commercial users. Further, it creates a bigger problem for such users than the paper distribution method did. Now, instead of waiting for the postman to arrive with several envelopes of paper schedules, the recipient now has to log-in to many different e-mail or bulletin board systems. You could also ask: how does WWW data really benefit the consumer if what he really seeks is a navigational tool ?

Infomedia's business concept has from the beginning focused primarily on the information flow between broadcasters and publishers. The company's intention has been to improve the flow, using new technology, and make the entire dissemination process efficient and economical.

As Europe's clearing house for TV listings data, we want to work even more efficiently with the channels than we do today. Infomedia is already creating mandatory and extended DVB "service information" feeds for a couple of the new EPGs. There are real challenges ahead, especially in organising a real-time, constantly updated scheduling data feed. So if there are any technical people out there who've got some comments, because their systems can already be integrated to improve the data flow in the way we've mentioned, let us hear from you!

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Personal Home TV Programming Guide

Hallenbeck, P.D. Hallenbeck, J.J.
Research Triangle Institute, NC

This paper appears in: **Consumer Electronics, 1990. ICCE 90. IEEE 1990 International Conference on**

Publication Date: June 6-8, 1990
On page(s): 310 - 311

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PERSONAL HOME TV PROGRAMMING GUIDE

Peter D. Hallenbeck
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P.O. Box 12194
Research Triangle Park, NC 27709

a description is given of

Abstract

The SuperGuide system is a low-cost, home-oriented, interactive, electronic, on-screen programming guide. When integrated with the TV tuner, remote control, and other devices, an exciting new component and capability emerges.

Introduction

The increase in the numbers and types of television programming available is a small part of today's information explosion. Television has grown from three networks and PBS to over 100 services. In addition to video overchoice, "tier-ing" and marketing have muddied the waters by allowing customers to subscribe to bits, pieces, and packages of programming. When deciding what to view, customary paper programming guides must show all possibilities. The viewer must wade through all of this information, selecting from descriptions of shows in packages to which he has subscribed. Then, by memory or little pieces of paper which are often lost in the dimly lit confines of the video viewing emporium, the viewer must translate the service (e.g., CBS network programming) to a channel and set the TV to that channel. For home satellite viewing, the act of tuning a service is complicated enough to keep many subscribers from fully realizing the potential of their system. The new SuperGuide system is an interactive programming guide which can receive a broadcast database of programming for only those services to which a viewer subscribes and present only that information on the TV screen. The presentation is controlled by the user's hand-held remote control unit. When the viewer selects the show, the Guide, connected to the TV, tunes in the show. In the case of direct to-home satellite information, the satellite and transponder (channel) for a service are used to make all tuning automatic. Additionally, shows are bundled together by *type* so the viewer may choose to have the Guide customized on-the-fly for only one *type* (e.g., movies or sports) of programming. Perhaps the best way to describe the system is to state that people do not watch *Channel 5* or *CBS* but, in fact, watch *I Love Lucy* or *Wall Street Week*. The goal of the Guide is to let the customer select the show. Matters concerning subscriptions, tuning, and networks are secondary to the content (or lack of it) of what is watched.

Background

The original SuperGuide system was developed in 1985. The hardware consisted of a simple discrete chip circuit board with a black and white bitmap display generator, 256 Kbytes of dynamic RAM, a radio frequency modem, some peripherals, and a power supply. The data for the Guide was transmitted on a satellite audio subcarrier using a narrow audio channel format. The signal was a Frequency Shift Key (FSK) modulated signal with a total bandwidth of 130 KHz. The signal was a simple asynchronous serial format, the same which has been used for years to communicate with computer terminals. The low cost of microprocessor serial port chips made this a good choice.

The transmission rate was a surprisingly low 4800 bits per second. If the quality of a home satellite system was as good as a commercial system, the system could have run four times faster. The quality of the systems, however, dictated the lower speed so the customers could load the listings into their unit with few or no errors. Even at this low rate, about two percent of the systems could not receive the information well enough to use it and about 20 percent of the systems load the information with some errors in the data.

All the uplink site equipment was custom-built due to our inability to locate equipment which could do FSK modulation at this low rate. This allowed us to design an inexpensive receiver for the data and adjust the manner in which the data was formated and transmitted to match and work with the receiver.

The bitmap display was chosen because it was the only way to print characters on the screen using proportional spacing, which not only reduces the "computery" look of the screen but also increases the printable number of characters per line. The graphic ability of the bitmap display also allows for the drawing of various lines and custom symbols (e.g., stereo headphones) borrowed from printed guides. This reinforces the programming guide concept in the TV viewer's mind. The bitmap size was 256 across by 190 down. This was enough for a 16-line display with a 5 x 7 font. It was later discovered that this font was too small for bleary-

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eyed end-of-the-day use. A test of a 7 x 9 font was so well accepted that it is the only font used in the new system.

The 256 Kbytes of memory has both the bitmap display (8 Kbytes), variables and stack space for the program (8 Kbytes), and the storage for the listings and service information (240 Kbytes). The original Guide loaded the listing for all the services available, much as the paper guides print the listings for all available services. The listings are stored in the local box to allow for immediate response to any actions taken by the viewer. This local storage makes the system very different from a teletext system and allows for many original features. A mechanism for selecting and showing only a viewer's favorite services allows the Guide to show only the programming to which the viewer subscribes. The same mechanism allows the listings to be searched for various subsets of programming, such as sports or movies, and presents one of those subsets on the TV screen. A small 100-word dictionary helped compress the listings about ten percent. The 256 Kbytes of memory could hold about four days of programming with 120 services.

The New SuperGuide System

Design of the new system began in 1988. Keeping in mind the perils of any "second system," we set out to correct the "undocumented features" in the first system and incorporate many of the little things we learned about people interactions with the original SuperGuide system. Many of the lessons learned apply to any interactive consumer device, such as VCR on-screen event programming and future IEEE Home Bus controllers. The hardware changes focus on the quality of the display, the data modem, and a secure encryption system. A gate array and a standard cell chip allow an increase in performance and a decrease in price.

The biggest change in the display is the addition of color and a 512 x 200 pixel display. The fonts are 7 x 9, stored on a 15 x 12 matrix. To keep the luminance bandwidth below 3 MHz, there is the restriction that three pixels in a row must be either *on* or *off*. This allows for extremely "smooth" characters due to the partial overlap of pixels. Color was added to attract customers. The new display format holds 14 lines of text on a screen, with 30 to 40 characters per line when in proportional space mode. Multiple fonts are supported. The data modem is a synchronous bitstream, with an on-board digital clock extractor. A 40-bit Error Correction Code was added so that burst errors of up to 17 bits could be corrected. This corrects for not only regular FM satellite transmission noise but also for the dreaded local "vacuum cleaner" noise. When a person in the house turns on a heavy appliance, sometimes even a light switch, a spike of noise couples through the receiver system and can cause an error.

The great DRAM crunch of '88 made us determined to significantly increase how much information we could store in a given amount of memory. We decided to switch to an active download system. The original system loaded all listings like an electronic mailbox with a paper guide placed inside of it. The new SuperGuide system examines each show and determines if it should be kept. It dynamically builds the single database of listings. A 4000-word dictionary compresses the text in the listings by 50 percent. The combined result of these two changes is one half the memory can store twice as many days of programming for a typical viewer. The DRAM requirements reduced eight 256K x 1 chips to a single 256K x 4.

The technical challenges of the system are immense. The hardware, which costs less that $40, has about as much power as the first Macintosh system. The broadcast database, the equivalent of a weekly programming guide, must be electronically "laid up," formated, and transmitted at least twice a day. The subscription price has to be less than a paper guide. The system must be secure or subscription revenue will be lost. Five years from now the system should cost about $10 to add to a TV or cable converter box.

Finally, the biggest challenge of all was to make SuperGuide *easy* enough to use so people *could* use it, yet *functional* enough so people *will* use it. Hierarchical menus are used throughout the Guide. Operation of all the menus, as well as the Guide itself, requires six buttons on the handheld: cursor keys *up* and *down*, page *forward* and page *back* keys, a *select* key and a *return* key. The biggest problem we've seen in most human interfaces is inconsistency. By forcing a consistency of use of these buttons, the education time for a viewer is about one minute. People are educated by showing them how to use the programming Guide first. Motivation: owners want to watch TV. Other functions (e.g., setup and article viewing) operate in the exact same manner, so by the time the owners have learned to use the Guide, they have the knowledge to use all the other features of the unit. It is similar to the problem of someone who only sets up his VCR for recording once a week. The procedure is done so infrequently that is is a challenge each time. If the procedure were done daily, the viewer would remember how to do it. Along those same lines, SuperGuide takes a show you want to record and passes the information to a standard event timer in a VCR or satellite receiver. Due to a lack of devices which can accept this information (i.e., Start time, Stop time, and Channel) from an external source, this is a feature waiting for the right hardware. When the VCRs which have bus interfacing exist, SuperGuide will be ready to make recording on your VCR truly as simple as finding the show you want to record and pressing a single button.

Conclusion

The new SuperGuide system will fit in well with tomorrow's world and will help people manage some of the information they deal with each day. Who knows, it might even save a few trees!

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	DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR		
☐	L33	725/39	616
☐	L32	725/52	161
☐	L31	L30 and (sub-categori$ or subcategori$)	13
☐	L30	l28 and category	54
☐	L28	L27 and (star near list or movie near list)	58
☐	L27	L25 and search	2187
☐	L26	L25 and star near2 list	7
☐	L25	(electronic near2 program$ near guide or tv with list$ or television with list)	7568
☐	L24	entertainment near system	5423
☐	L23	707/100	5128
☐	L22	725/53	150
☐	L21	725/45	192
☐	L20	725/7	47
☐	L19	725/1	335
☐	L18	725.clas.	9835
☐	L17	463/42	1685
☐	L16	707.clas.	22475
☐	L15	725.clas.	9835
☐	L14	463.clas.	9461
☐	L13	348/569	1098
☐	L12	348/460	899
☐	L11	348.clas.	63529
☐	L10	345.clas.	70493
☐	L9	345/725	48
☐	L8	345/700	1095
☐	L7	345/594	136
☐	L6	345/851	57
☐	L5	345/820	23
☐	L4	345/819	27

☐	L3	345/818	31
☐	L2	345/817	68
☐	L1	345/810	1110

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